

Workshop RESMM'14 – Abstract of the presentation

RADIATION DAMAGE STUDIES FOR THE LHC COLLIMATOR MATERIALS

The luminosity, intensity and energy upgrade foreseen for the Large Hadron Collider (LHC) at CERN poses important concerns for the equipment exposed to radiation from proton and ion beams. In particular, the collimators that ensure efficient beam halo cleaning and passive machine protection are exposed to high beam losses and absorb a large fraction of the total LHC stored beam energy. The expected doses at the hottest locations might lead to severe degradation of electrical and mechanical properties of the collimator materials and to severe limitations of the system performance.

Irradiation tests on present and promising future collimator materials are now going on in collaboration with Kurchatov Institute, BNL and GSI. The main goal is to define a threshold for radiation damage above which collimators might need to be replaced, e.g. because of the worsening of the impedance from increased electrical resistivity or compromised positioning accuracy due to radiation swelling and/or loss of thermal conductivity. The robustness of collimator material against fast beam losses is studied at the CERN HiRadMat facility where collimator materials samples can be tested with high-intensity proton beams at 440 GeV.